Chapter X

Modeling the Resource Perspective of Business Processes by UML Activity Diagram and Object Petri Net

Kamyar Sarshar, Institute for Information Systems (IWi) at the German Research Center for Artificial Intelligence (DFKI), Germany

Peter Loos, Institute for Information Systems (IWi) at the German Research Center for Artificial Intelligence (DFKI), Germany

ABSTRACT

Given that business processes are performed in an organizational context, it is essential that process-modeling notations provide proper mechanisms to represent the resources perspective of business processes. After relating the resource perspective within a framework to other business process perspectives and discussing the life cycle resource models undergo, this contribution introduces the UML 2.0 activity diagrams as well as object Petri nets regarding their approach to model the resource perspective of business processes. Afterwards, the application of the notations is illustrated by a real-life process of the health-care domain. The following comparison of the notations indicates the benefits and the limitations of both notations.

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INTRODUCTION

Business processes are market-centered representations of organizational activities toward the satisfaction of specific customer needs (Becker, Dreiling, Holten, & Ribbert, 2003; Georgakopoulos, Hornick, & Sheth, 1995; Scheer, 1998). The aspect of business process modeling that has been deeply investigated is the representation of the control-flow. The control-flow describes the execution order of tasks through constructors that permit the flow of execution control (Kiepuszewski, ter Hofstede, & van der Aals, 2001). Investigation on the control-flow perspective has recently gained maturity by the identification and formal definition of a set of patterns that can be used for the evaluation of process modeling notations (Russell, ter Hofstede, Edmond, & van der Aalst, 2004; van der Aalst, ter Hofstede, Kiepuszewski, & Barros, 2003). Dumas and Hofstede have investigated the strengths and limitations of UML 2.0 activity diagrams for business process modeling regarding the control-flow perspective by examining their ability to represent those patterns (2001).

While investigations on the control-flow have gained substantial interest, the resource perspective that deals with the involvement of human and nonhuman activity performers in the execution of tasks has received significantly less attention (Basu & Kumar, 2002). But given that business processes are performed in an organizational context, it is essential that notations applied to business process modeling provide proper mechanisms to represent the structure of the resource perspective, as well as to offer adequate mechanisms to allocate tasks to the resources responsible for their execution.

Within this chapter, we investigate UML 2.0 activity diagrams capabilities to model the resource perspective of business processes. Since the UML activity diagram has been closely related to the concept of Petri nets, our contribution compares them with the Petri net formalism. We have chosen the object Petri net that has emerged to combine Petri nets with the object-oriented paradigm (Valk, 2004). It allows the definition of tokens again as Petri nets, and has already been applied to process modeling by a number of contributions (Moldt & Valk, 2000; Valk, 1998; van der Aalst, Moldt, Valk, & Wienberg, 1999). To demonstrate the application of both notations in terms of resource modeling, we will model real-life processes of the health-care domain.

The reminder of this chapter is as follows: the section after this introduction will introduce a conceptual framework for business process modeling, and puts the resources perspective and its application in the broader view of a business processes life cycle. Additionally, the section defines a number of relevant terms that are not used consistently within the literature. In Section 3, we introduce the UML 2.0 activity diagrams and discuss their approach to resource modeling. Section 4, accordingly, introduces the object Petri nets. Section 5 presents the application of the notations by a real-life health-care process. Section 6 presents a comparison of the two notations. The final section concludes with a brief summary and suggestions for future fields of work.

RESOURCE PERSPECTIVE OF BUSINESS PROCESSES

Conceptual Framework

A common way of dealing with the complexity of business processes is to define distinctive perspectives, clarify the contents of each perspective, and describe within a framework...
A Procedure Model for a SOA-Based Integration of Enterprise Systems
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